

SEQUENCE LISTING

<110> KONDOROSI, Eva

CEBOLLA, Angel

KONDOROSI, Adam

<120> PLANT PROTEIN WITH REPEATED WD40 MOTIFFS, NUCLEIC ACID CODING FOR
SAID PROTEIN, AND USES THEREOF

<130> 200204US0PCT

<140> 09/701,572

<141> 2000-12-08

<150> PCT/FR99/01`342

<151> 1999-06-08

<150> FR07174

<151> 1998-08-06

<160> 13

<170> PatentIn version 3.1

<210> 1

<211> 2006

<212> DNA

<213> Medicago sativa

<220>

<221> CDS

<222> (182)..(1609)

<223>

<400> 1

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tgcaaaaaat tcttttacag cgttcttttt tccccgggaa aaaaattaac acagctccgc	180
catg gac gga acc ggt aat cga aat cca cca ccg act tcc acc gtc aga	229
Met Asp Gly Thr Gly Asn Arg Asn Pro Pro Pro Thr Ser Thr Val Arg	
5 10 15	
gac aat tct cca ccg cct gag cca tca ccg gag agt ctc cgt cat gta	277
Asp Asn Ser Pro Pro Pro Glu Pro Ser Pro Glu Ser Leu Arg His Val	
20 25 30	
acc cgt atg atc aac agc aac cat tac acc tca cct tct cga aca atc	325
Ser Arg Met Ile Asn Ser Asn His Tyr Thr Ser Pro Ser Arg Thr Ile	
35 40 45	
tac tcc gat agg ttc att ccg agt aga tct gct tcg aaa ttc gct ttg	373
Tyr Ser Asp Arg Phe Ile Pro Ser Arg Ser Ala Ser Lys Phe Ala Leu	
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ttt gat atc aat act ccg aca gaa gga cgc gat gat agt tcc agc gct	421
Phe Asp Ile Asn Thr Pro Thr Glu Gly Arg Asp Asp Ser Ser Ser Ala	
65 70 75 80	
tat acg act ctt ctg aga acg gcg ttg ttt gga ccg gat gtt gcc ggt	469
Tyr Thr Thr Leu Leu Arg Thr Ala Leu Phe Gly Pro Asp Val Ala Gly	
85 90 95	
ccg gtt acg ccg gaa aaa acc gac tcg ccg tcg atg aca ttg ccg aat	517
Pro Val Thr Pro Glu Lys Thr Asp Ser Pro Ser Met Thr Leu Pro Asn	
100 105 110	
agg aat att ttt agg tat aag acg gag acg aga cag tcc atg cac tcg	565
Arg Asn Ile Phe Arg Tyr Lys Thr Glu Thr Arg Gln Ser Met His Ser	
115 120 125	

ctt	tcg	ccg	ttt	atg	gat	gat	gat	ttt	gtt	cct	ggg	gtt	aat	cat	agt	613
Leu	Ser	Pro	Phe	Met	Asp	Asp	Asp	Phe	Val	Pro	Gly	Val	Asn	His	Ser	
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ccg	gtt	aag	gct	cct	agg	aag	gtt	cct	cga	tcg	cct	tat	aag	gtt	ttg	661
Pro	Val	Lys	Ala	Pro	Arg	Lys	Val	Pro	Arg	Ser	Pro	Tyr	Lys	Val	Leu	
145					150					155					160	
gat	gca	cct	gct	ttg	caa	gat	gat	ttt	tat	ctg	aat	ctg	gta	gat	tgg	709
Asp	Ala	Pro	Ala	Leu	Gln	Asp	Asp	Phe	Tyr	Leu	Asn	Leu	Val	Asp	Trp	
				165					170					175		
tct	tca	cac	aat	gtg	ttg	gct	gtt	ggg	ttg	ggg	aac	tgt	gtc	tat	ctc	757
Ser	Ser	His	Asn	Val	Leu	Ala	Val	Gly	Leu	Gly	Asn	Cys	Val	Tyr	Leu	
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tgg	aat	gct	tgt	agc	agc	aag	gta	act	aaa	tta	tgt	gat	ttg	ggg	gtt	805
Trp	Asn	Ala	Cys	Ser	Ser	Lys	Val	Thr	Lys	Leu	Cys	Asp	Leu	Gly	Val	
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Asp	Asp	Cys	Val	Cys	Ser	Val	Gly	Trp	Ala	Gln	Arg	Gly	Thr	His	Leu	
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gct	gtt	gga	act	aac	aat	ggg	aaa	gtt	cag	att	tgg	gat	gca	gca	aga	901
Ala	Val	Gly	Thr	Asn	Asn	Gly	Lys	Val	Gln	Ile	Trp	Asp	Ala	Ala	Arg	
225					230					235					240	
tgc	aag	aag	ata	aga	tca	atg	gag	ggc	cat	cgg	tta	cgt	gtc	ggg	gcc	949
Cys	Lys	Lys	Ile	Arg	Ser	Met	Glu	Gly	His	Arg	Leu	Arg	Val	Gly	Ala	
				245					250					255		
ttg	gcc	tgg	agt	tca	tct	ctt	ttg	tct	tct	ggg	gga	cgg	gat	aag	aat	997
Leu	Ala	Trp	Ser	Ser	Ser	Leu	Leu	Ser	Ser	Gly	Gly	Arg	Asp	Lys	Asn	
			260					265					270			
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Ile	Tyr	Gln	Arg	Asp	Ile	Arg	Thr	Gln	Glu	Asp	Phe	Val	Ser	Lys	Leu	
		275					280					285				
tca	gga	cac	aaa	tca	gag	gtt	tgt	gga	ctg	aag	tgg	tca	tat	gat	aac	1093
Ser	Gly	His	Lys	Ser	Glu	Val	Cys	Gly	Leu	Lys	Trp	Ser	Tyr	Asp	Asn	
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cgt	gag	ttg	gca	tct	gga	gga	aat	gac	aac	aaa	ttg	ttt	gtt	tgg	aat	1141
Arg	Glu	Leu	Ala	Ser	Gly	Gly	Asn	Asp	Asn	Lys	Leu	Phe	Val	Trp	Asn	
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caa	cac	tca	acc	cag	cct	gtc	ctc	aag	tac	tgt	gag	cac	aca	gca	gct	1189
Gln	His	Ser	Thr	Gln	Pro	Val	Leu	Lys	Tyr	Cys	Glu	His	Thr	Ala	Ala	
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 Val Lys Ala Ile Ala Trp Ser Pro His Leu His Gly Leu Leu Ala Ser
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 gga gga gga act gca gat aga tgt att cgt ttt tgg aat aca acc aca 1285
 Gly Gly Gly Thr Ala Asp Arg Cys Ile Arg Phe Trp Asn Thr Thr Thr
 355 360 365
 aac tca cac ctt agc tgt atg gac act gga agt cag gtt tgc aat ctt 1333
 Asn Ser His Leu Ser Cys Met Asp Thr Gly Ser Gln Val Cys Asn Leu
 370 375 380
 gtc tgg tcc aaa aat gtc aac gaa cta gta agc aca cat ggg tac tcc 1381
 Val Trp Ser Lys Asn Val Asn Glu Leu Val Ser Thr His Gly Tyr Ser
 385 390 395 400
 cag aac cag att att gtt tgg aga tac ccc act atg tca aag ctg gcg 1429
 Gln Asn Gln Ile Ile Val Trp Arg Tyr Pro Thr Met Ser Lys Leu Ala
 405 410 415
 acc ctt acc ggc cat act tat agg gtt ctc tat ctt gcc atc tct cca 1477
 Thr Leu Thr Gly His Thr Tyr Arg Val Leu Tyr Leu Ala Ile Ser Pro
 420 425 430
 gaa gga cag act att gta act gga gct gga gat gaa acg ctt agg ttc 1525
 Asp Gly Gln Thr Ile Val Thr Gly Ala Gly Asp Glu Thr Leu Arg Phe
 435 440 445
 tga aat gtt ttc cct tcc cct aaa tca cag aat act gaa agt gaa atc 1573
 Trp Asn Val Phe Pro Ser Pro Lys Ser Gln Asn Thr Glu Ser Glu Ile
 450 455 460
 gga gca tta tct ctt gga aga act act atc agg tga ttgatacctgg 1619
 Gly Ala Leu Ser Leu Gly Arg Thr Thr Ile Arg
 465 470 475
 cgttgcagcc caatcatgtg gcatatttct aagtttgggt tgctgtgtag aactaaattt 1679
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<210> 2

<211> 475

<212> PRT

<213> Medicago sativa

<400> 2

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1 5 10 15

Asp Asn Ser Pro Pro Pro Glu Pro Ser Pro Glu Ser Leu Arg His Val
20 25 30

Ser Arg Met Ile Asn Ser Asn His Tyr Thr Ser Pro Ser Arg Thr Ile
35 40 45

Tyr Ser Asp Arg Phe Ile Pro Ser Arg Ser Ala Ser Lys Phe Ala Leu
50 55 60

Phe Asp Ile Asn Thr Pro Thr Glu Gly Arg Asp Asp Ser Ser Ser Ala
65 70 75 80

Tyr Thr Thr Leu Leu Arg Thr Ala Leu Phe Gly Pro Asp Val Ala Gly
85 90 95

Pro Val Thr Pro Glu Lys Thr Asp Ser Pro Ser Met Thr Leu Pro Asn
100 105 110

Arg Asn Ile Phe Arg Tyr Lys Thr Glu Thr Arg Gln Ser Met His Ser
115 120 125

Leu Ser Pro Phe Met Asp Asp Asp Phe Val Pro Gly Val Asn His Ser
130 135 140

Pro Val Lys Ala Pro Arg Lys Val Pro Arg Ser Pro Tyr Lys Val Leu
145 150 155 160

Asp Ala Pro Ala Leu Gln Asp Asp Phe Tyr Leu Asn Leu Val Asp Trp
165 170 175

Ser Ser His Asn Val Leu Ala Val Gly Leu Gly Asn Cys Val Tyr Leu
180 185 190

Trp Asn Ala Cys Ser Ser Lys Val Thr Lys Leu Cys Asp Leu Gly Val
195 200 205

Asp Asp Cys Val Cys Ser Val Gly Trp Ala Gln Arg Gly Thr His Leu
210 215 220

Ala Val Gly Thr Asn Asn Gly Lys Val Gln Ile Trp Asp Ala Ala Arg
225 230 235 240

Cys Lys Lys Ile Arg Ser Met Glu Gly His Arg Leu Arg Val Gly Ala
245 250 255

Leu Ala Trp Ser Ser Ser Leu Leu Ser Ser Gly Gly Arg Asp Lys Asn
260 265 270

Ile Tyr Gln Arg Asp Ile Arg Thr Gln Glu Asp Phe Val Ser Lys Leu
275 280 285

Ser Gly His Lys Ser Glu Val Cys Gly Leu Lys Trp Ser Tyr Asp Asn
290 295 300

Arg Glu Leu Ala Ser Gly Gly Asn Asp Asn Lys Leu Phe Val Trp Asn
305 310 315 320

Gln His Ser Thr Gln Pro Val Leu Lys Tyr Cys Glu His Thr Ala Ala
325 330 335

Val Lys Ala Ile Ala Trp Ser Pro His Leu His Gly Leu Leu Ala Ser
340 345 350

Gly Gly Gly Thr Ala Asp Arg Cys Ile Arg Phe Trp Asn Thr Thr Thr
355 360 365

Asn Ser His Leu Ser Cys Met Asp Thr Gly Ser Gln Val Cys Asn Leu
370 375 380

Val Trp Ser Lys Asn Val Asn Glu Leu Val Ser Thr His Gly Tyr Ser
385 390 395 400

Gln Asn Gln Ile Ile Val Trp Arg Tyr Pro Thr Met Ser Lys Leu Ala
405 410 415

Thr Leu Thr Gly His Thr Tyr Arg Val Leu Tyr Leu Ala Ile Ser Pro
420 425 430

Asp Gly Gln Thr Ile Val Thr Gly Ala Gly Asp Glu Thr Leu Arg Phe
435 440 445

Trp Asn Val Phe Pro Ser Pro Lys Ser Gln Asn Thr Glu Ser Glu Ile
450 455 460

Gly Ala Leu Ser Leu Gly Arg Thr Thr Ile Arg
465 470 475

<210> 3

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetic DNA

<400> 3

tttgggggtt gatgattgtg

20

<210> 4

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<212> DNA

<213> Artificial Sequence

<220>

<223> synthetic DNA

<400> 4

ctctctaccg ttctatctct tggga

25

<210> 5

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetic DNA

<400> 5

ggttaaagatg ctactttggt ggtgt

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<210> 6

<211> 56

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetic DNA

<400> 6

agcttcccgg gggagctcta gactcgagca gctaggcccc tcgagatctg agctcg

56

<210> 7

<211> 526

<212> PRT

<213> Drosophila melanogaster

<400> 7

Met Ser Gln Phe Asn Phe Val Ser Asp Leu Gln Asn Ala Leu Ile Met
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Asp Gly Glu Thr Arg Gly Pro Ala Pro Arg Trp Lys Lys Lys Leu Glu
20 25 30

Ala Ser Leu Asn Gly Ser Val Asn Thr Thr Arg Ser Val Leu Ser Val
35 40 45

Ser Tyr Asn Thr Ser Phe Ser Gly Val Gln Ala Pro Thr Lys Thr Pro
50 55 60

Gly Lys Ser Ser Glu Gly Lys Thr Lys Lys Ser Asn Thr Thr Pro Ser
65 70 75 80

Lys Thr Pro Gly Gly Gly Asp Arg Phe Ile Pro Asn Arg Ala Ala Thr
85 90 95

Asn Phe Glu Leu Ala His Phe Leu Val Asn Lys Asp Ser Gly Asp Lys
100 105 110

Ser Asp Glu Glu Asn Asp Lys Ala Thr Ser Ser Asn Ser Asn Glu Ser
115 120 125

Asn Val Gln Ala Ser Ala His Lys Gly Asp Arg Gln Lys Leu Ile Ser
130 135 140

Glu Val Ala Gln Val Gly Asp Ser Lys Gly Gly Arg Ile Leu Cys Tyr
145 150 155 160

Gln Asn Lys Ala Pro Ala Ala Pro Glu Thr His Asn Asn Pro Leu Lys
165 170 175

Val Val Tyr Ser Ile Lys Thr Pro Ile Ser Thr Lys Ser Gly Ser Arg
180 185 190

Tyr Ile Pro Thr Thr Ser Glu Arg Ile Leu Asp Ala Pro Asp Phe Ile

195

200

205

Asn Asp Tyr Tyr Leu Asn Leu Met Asp Trp Ser Ala Asp Asn Ile Val
 210 215 220

Ala Val Ala Leu Gly Ser Cys Val Tyr Leu Trp Asn Ala Gln Thr Gly
 225 230 235 240

Asn Ile Glu Gln Leu Thr Glu Phe Glu Glu Gly Asp Tyr Ala Gly Ser
 245 250 255

Leu Ser Trp Ile Gln Glu Gly Gln Ile Leu Ala Ile Gly Asn Ser Thr
 260 265 270

Gly Ala Val Glu Leu Trp Asp Cys Ser Lys Val Lys Arg Leu Arg Val
 275 280 285

Met Asp Gly His Ser Ala Arg Val Gly Ser Leu Ala Trp Asn Ser Phe
 290 295 300

Leu Val Ser Ser Gly Ser Arg Asp Gly Thr Ile Val His His Asp Val
 305 310 315 320

Arg Ala Arg Glu His Lys Leu Ser Thr Leu Ser Gly His Thr Gln Glu
 325 330 335

Val Cys Gly Leu Lys Trp Ser Thr Asp Phe Lys Tyr Leu Ala Ser Gly
 340 345 350

Gly Asn Asp Asn Leu Val Asn Val Trp Ser Ala Ala Ser Gly Gly Val
 355 360 365

Gly Thr Ala Thr Asp Pro Leu His Lys Phe Asn Asp His Gln Ala Ala
 370 375 380

Val Arg Ala Leu Ala Trp Cys Pro Trp Gln Pro Ser Thr Leu Ala Ser
 385 390 395 400

Gly Gly Gly Thr Ala Asp Arg Cys Ile Lys Phe Trp Asn Val Asn Asn

405

410

415

Gly Thr Leu Met Lys Ser Val Asp Ser Lys Ser Gln Val Cys Ser Leu
 420 425 430

Leu Phe Ser Arg His Tyr Lys Glu Leu Ile Ser Ala His Gly Phe Ala
 435 440 445

Asn Asn Gln Leu Thr Ile Trp Lys Tyr Pro Thr Met Val Lys Gln Ala
 450 455 460

Asp Leu Thr Gly His Thr Ser Arg Val Leu Gln Met Ala Met Ser Pro
 465 470 475 480

Asp Gly Ser Thr Val Ile Ser Ala Gly Ala Asp Glu Thr Leu Arg Leu
 485 490 495

Trp Asn Cys Phe Ala Pro Asp Pro Leu Ala Ser Lys Lys Ala Val Ser
 500 505 510

Thr Ser Lys Gly Lys Gln Ser Val Phe Arg Gln Ser Ile Arg
 515 520 525

<210> 8

<211> 478

<212> PRT

<213> Drosophila melanogaster

<400> 8

Met Phe Ser Pro Glu Tyr Glu Lys Arg Ile Leu Lys His Tyr Ser Pro
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Val Ala Arg Asn Leu Phe Asn Asn Phe Glu Ser Ser Thr Thr Pro Thr
 20 25 30

Ser Leu Asp Arg Phe Ile Pro Cys Arg Ala Tyr Asn Asn Trp Gln Thr

35

40

45

Asn Phe Ala Ser Ile Asn Lys Ser Asn Asp Asn Ser Pro Gln Thr Ser
50 55 60

Lys Lys Gln Arg Asp Cys Gly Glu Thr Ala Arg Asp Ser Leu Ala Tyr
65 70 75 80

Ser Cys Leu Leu Lys Asn Glu Leu Leu Gly Ser Ala Ile Asp Asp Val
85 90 95

Lys Thr Ala Gly Glu Glu Arg Asn Glu Asn Ala Tyr Thr Pro Ala Ala
100 105 110

Lys Arg Ser Leu Phe Lys Tyr Gln Ser Pro Thr Lys Gln Asp Tyr Asn
115 120 125

Gly Glu Cys Pro Tyr Ser Leu Ser Pro Val Ser Ala Lys Ser Gln Lys
130 135 140

Leu Leu Arg Ser Pro Arg Lys Ala Thr Arg Lys Ile Ser Arg Ile Pro
145 150 155 160

Phe Lys Val Leu Asp Ala Pro Glu Leu Gln Asp Asp Phe Tyr Leu Asn
165 170 175

Leu Val Asp Trp Ser Ser Gln Asn Val Leu Ala Val Gly Leu Gly Ser
180 185 190

Cys Val Tyr Leu Trp Ser Ala Cys Thr Ser Gln Val Thr Arg Leu Cys
195 200 205

Asp Leu Ser Pro Asp Ala Asn Thr Val Thr Ser Val Ser Trp Asn Glu
210 215 220

Arg Gly Asn Thr Val Ala Val Gly Thr His His Gly Tyr Val Thr Val
225 230 235 240

Trp Asp Val Ala Ala Asn Lys Gln Ile Asn Lys Leu Asn Gly His Ser

245

250

255

Ala Arg Val Gly Ala Leu Ala Trp Asn Ser Asp Ile Leu Ser Ser Gly
 260 265 270

Ser Arg Asp Arg Trp Ile Ile Gln Arg Asp Thr Arg Thr Pro Gln Leu
 275 280 285

Gln Ser Glu Arg Arg Leu Ala Gly His Arg Gln Glu Val Cys Gly Leu
 290 295 300

Lys Trp Ser Pro Asp Asn Gln Tyr Leu Ala Ser Gly Gly Asn Asp Asn
 305 310 315 320

Arg Leu Tyr Val Trp Asn Gln His Ser Val Asn Pro Val Gln Ser Tyr
 325 330 335

Thr Glu His Met Ala Ala Val Lys Ala Ile Ala Trp Ser Pro His His
 340 345 350

His Gly Leu Leu Ala Ser Gly Gly Gly Thr Ala Asp Arg Cys Ile Arg
 355 360 365

Phe Trp Asn Thr Leu Thr Gly Gln Pro Met Gln Cys Val Asp Thr Gly
 370 375 380

Ser Gln Val Cys Asn Leu Ala Trp Ser Lys His Ser Ser Glu Leu Val
 385 390 395 400

Ser Thr His Gly Tyr Ser Gln Asn Gln Ile Leu Val Trp Lys Tyr Pro
 405 410 415

Ser Leu Thr Gln Val Ala Lys Leu Thr Gly His Ser Tyr Arg Val Leu
 420 425 430

Tyr Leu Ala Leu Ser Pro Asp Gly Glu Ala Ile Val Thr Gly Ala Gly
 435 440 445

Asp Glu Thr Leu Arg Phe Trp Asn Val Phe Ser Lys Ala Arg Ser Gln

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455

460

Lys Glu Asn Lys Ser Val Leu Asn Leu Phe Ala Asn Ile Arg
 465 470 475

<210> 9

<211> 565

<212> PRT

<213> Saccharomyces cerevisiae

<400> 9

Met Ser Thr Asn Leu Asn Pro Phe Met Asn Asn Thr Phe Ser Ser Ser
 1 5 10 15

Pro Leu Lys Gly Ser Lys Ser Lys Arg Val Ser Lys His Pro Ile Ser
 20 25 30

Ser Ser Ser Ser Ala Ser Leu Leu Ser Ser Pro Ser Arg Arg Ser Arg
 35 40 45

Pro Ser Thr Val Tyr Gln Asp Arg Tyr Tyr Pro Ser Arg Thr Asp Ile
 50 55 60

Asp Phe Phe Ser Ile Val Ser Ile Ser Ser Met Ala Ser Val Pro Ala
 65 70 75 80

Leu Asn Pro Ser Ser Thr Lys Asp Gln Val Glu Tyr Gln Lys Lys Arg
 85 90 95

Gln Ala His Glu Thr Tyr Asn Thr Leu Leu Lys Asn Glu Leu Phe Gly
 100 105 110

Lys His Leu Ser Lys Asp Thr Val Gln Ser Lys Ser Ser Ile Asp Arg
 115 120 125

Ile Lys Asn Thr Arg Pro Ser Thr Arg Gln Asn Val His Ala Lys Asn

130

135

140

Thr Thr Arg Met Gly Tyr Glu Leu Glu Arg Val Ser Thr Phe Pro Pro
 145 150 155 160

Lys Ala Ala Gly Leu Lys Lys Phe Ser Pro His Ser Thr Phe Val Thr
 165 170 175

Pro Arg Arg Leu Phe Thr Ser Gln Gln Asp Lys Ile Thr Arg Pro Ser
 180 185 190

Ser Asn Ser Val Arg Gly Ala Ser Leu Leu Thr Tyr Gln Gln Arg Lys
 195 200 205

Gly Arg Arg Leu Ser Ala Ala Ser Leu Leu Gln Ser Gln Phe Phe Asp
 210 215 220

Ser Met Ser Pro Val Arg Pro Asp Ser Lys Gln Leu Leu Leu Ser Pro
 225 230 235 240

Gly Ile Gln Phe Arg Gln Ile Ala Lys Val Pro Tyr Arg Val Leu Asp
 245 250 255

Ala Pro Ser Leu Ala Asp Asp Phe Tyr Tyr Ser Leu Ile Asp Trp Ser
 260 265 270

Ser Thr Asp Val Leu Ala Val Ala Leu Gly Lys Ser Ile Phe Leu Thr
 275 280 285

Asp Asn Asn Thr Gln Asp Val Val Glu Leu Cys Asp Thr Glu Asn Glu
 290 295 300

Tyr Thr Ser Leu Ser Trp Ile Gln Ala Gly Ser His Leu Ala Val Gly
 305 310 315 320

Gln Ala Asn Gly Leu Val Glu Ile Tyr Asp Asp Val Met Lys Arg Lys
 325 330 335

Cys Tyr Arg Thr Leu Ser Gly His Ile Asp Arg Val Ala Cys Leu Ser

340

345

350

Trp Asn Asn His Val Leu Thr Ser Gly Ser Arg Asp His Met Ile Leu
 355 360 365

Met Arg Asp Val Arg Met Pro Asp Phe Phe Phe Arg Thr Ile Lys Ser
 370 375 380

His Thr Gln Glu Val Cys Gly Leu Lys Trp His Val Ala Asp Asn Lys
 385 390 395 400

Leu Ala Ser Gly Gly Asn Asp Asn Val Val Asn Val Thr Glu Gln Thr
 405 410 415

Ser Lys Ser Pro Ile Leu Thr Phe Asp Glu His Lys Ala Ala Val Lys
 420 425 430

Ala Lys Ala Trp Ser Pro His Lys Arg Gly Val Leu Ala Thr Gly Gly
 435 440 445

Gly Thr Ala Asp Arg Arg Leu Lys Leu Trp Asn Val Asn Thr Ser Ile
 450 455 460

Lys Met Ser Asp Ile Asp Ser Gly Ser Gln Ile Cys Asn Asn Val Trp
 465 470 475 480

Ser Lys Asn Glu Leu Val Thr Ser His Gly Tyr Ser Lys Tyr Asn Leu
 485 490 495

Thr Leu Trp Asp Cys Asn Ser Met Asp Pro Ile Ala Ile Leu Lys Gly
 500 505 510

His Ser Phe Arg Val Leu His Leu Thr Leu Ser Asn Asp Gly Thr Thr
 515 520 525

Val Val Ser Gly Ala Gly Asp Glu Thr Leu Arg Tyr Trp Lys Leu Phe
 530 535 540

Asp Lys Pro Lys Ala Lys Val Gln Pro Asn Ser Leu Lys Phe Asp Ala

545

550

555

560

Phe Asn Gln Ile Arg
565

<210> 10

<211> 556

<212> PRT

<213> Schizosaccharomyces pombe

<400> 10

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1 5 10 15

Ala Asn Arg Asn Ser Asn Asn Ser Met Asn Arg Val Glu Asn Asn Asn
20 25 30

Ser Asn Ser Asp Ser Ala Asn Thr Val Asp Ser Arg Gly Asp Ala His
35 40 45

Thr Arg Met Arg Gln Gly Phe Glu Lys Ser Phe Pro Ser Ser Pro Asn
50 55 60

Lys Lys Arg Pro Arg Thr Asn Glu Gly Asp Arg Phe Ile Pro Ser Arg
65 70 75 80

Asp Ala Ser Thr Glu Leu Trp Thr Gly Phe Thr Lys Val Glu Gly Pro
85 90 95

Leu Thr Pro Val Lys Lys Lys Gln Ser Val Ala Asp Arg Asn Phe Thr
100 105 110

Thr Leu Leu Arg Ser Glu Leu Phe Gly Ser Asn Asp Glu Thr Phe Asn
115 120 125

Asn Ser Pro Ile Ala Thr Pro Asn Thr Thr Ile Gly Val Ser Thr Pro

130

135

140

Arg Thr Asp Ser Gly Ile Asp Asp Ile Glu Leu Thr Gln Arg Thr Pro
 145 150 155 160

Pro Ser Ser Ser His Thr Ser Ser Ser Ile Leu Gln Asn Thr Pro Val
 165 170 175

Thr Pro Ser Arg Lys Ile Phe His Tyr Leu Ser Pro Arg Asp Arg Asn
 180 185 190

Lys Ser Ser Tyr Gly Lys Lys Ala Gln Tyr Gln Asp Asn Pro Asn Arg
 195 200 205

Thr Ile Tyr Ser Leu Ser Pro Val Arg Ser Ile Thr Lys Asp Leu Ile
 210 215 220

Ser Ala Ser Arg Leu Glu Gly Arg Glu Leu Pro Ser Ile Pro Tyr Arg
 225 230 235 240

Val Leu Asp Ala Pro Gly Leu Ala Gly Asp Phe Tyr Leu Asn Leu Leu
 245 250 255

Asp Trp Gly Gln Cys Asn Met Leu Ala Val Ala Leu Ala Ser Arg Val
 260 265 270

Tyr Leu Trp Ser Gly Ile Ser Ser Glu Val Thr Val Met His Asn Phe
 275 280 285

Tyr Pro Thr Asp Thr Val Thr Ser Leu Arg Trp Val Gln Arg Gly Thr
 290 295 300

His Leu Ala Val Gly Thr His Asn Gly Ser Val Glu Ile Trp Asp Ala
 305 310 315 320

Ala Thr Cys Lys Lys Thr Arg Thr Met Ser Gly His Thr Glu Arg Val
 325 330 335

Gly Ala Leu Ser Trp Asn Asp His Val Leu Ser Ser Gly Gly Arg Asp

340

345

350

Asn His Ile Leu His Arg Asp Val Arg Ala Pro Glu His Tyr Phe Arg
 355 360 365

Val Leu Thr Ala His Arg Gln Glu Val Cys Gly Leu Glu Trp Asn Ser
 370 375 380

Asn Glu Asn Leu Leu Ala Ser Gly Gly Asn Asp Asn Ala Leu Met Val
 385 390 395 400

Trp Asp Lys Phe Glu Glu Lys Pro Leu Tyr Ser Phe His Asn His Ile
 405 410 415

Ala Ala Val Lys Ala Ile Thr Trp Ser Pro His Gln Arg Gly Ile Leu
 420 425 430

Ala Ser Gly Gly Gly Thr Ala Asp Arg Thr Ile Lys Leu Trp Asn Thr
 435 440 445

Gln Arg Gly Ser Met Leu His Asn Ile Asp Thr Gly Ser Gln Val Cys
 450 455 460

Asn Leu Leu Trp Ser Lys Gln Thr Asn Glu Phe Ile Ser Thr His Gly
 465 470 475 480

Phe Met Glu Asn Glu Val Ala Leu Trp Asn Tyr Pro Ser Val Ser Arg
 485 490 495

Val Gly Thr Leu Lys Gly His Thr Asp Arg Val Leu Tyr Leu Ala Met
 500 505 510

Ser Pro Asn Gly Glu Asn Ile Val Thr Gly Ala Ala Asp Glu Thr Leu
 515 520 525

Arg Phe Trp Lys Leu Phe Asp Ser Lys Ser Lys His Ser Ala Ser Thr
 530 535 540

Met Ser Ser Pro Phe Asp Pro Thr Met Lys Ile Arg

545

550

555

<210> 11

<211> 439

<212> PRT

<213> Arabidopsis thaliana

<400> 11

Met Arg Ala Thr Cys Thr Val Pro Glu His Phe Leu Pro Lys Leu Ser
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Lys Gln Asn Leu Asp Arg Phe Ile Pro Asn Arg Ser Ala Lys Asp Phe
20 25 30

Asp Phe Ala Asn Tyr Ala Leu Thr Gln Gln Ser Lys Arg Asn Leu Cys
35 40 45

Lys Val Thr Ser Ala Ser Arg Lys Ala Tyr Met Thr Gln Leu Ala Val
50 55 60

Val Met Asn Gln Asn Arg Thr Arg Ile Leu Ala Phe Arg Asn Lys Pro
65 70 75 80

Lys Ser Leu Leu Ser Thr Asn His Ser Asp Ser Pro Asn Gln Asn Pro
85 90 95

Lys Pro Val Lys Pro Arg Arg Tyr Ile Pro Gln Asn Ser Lys Ala Val
100 105 110

Leu Asp Ala Pro Gly Leu Ala Asp Asp Phe Ser Leu Asn Leu Leu Asp
115 120 125

Trp Gln Ser Ala Asn Val Leu Ala Ile Ala Leu Gly Asp Thr Val Tyr
130 135 140

Leu Trp Asp Ala Ser Ser Gly Ser Thr Ser Asp Leu Val Thr Ile Asp

145		150		155		160
Lys Asp Lys Gly Pro Val Thr Ser Ile Asn Trp Thr Gln Asp Gly Leu		165		170		175
Asp Leu Ala Val Gly Leu Asp Asn Ser Lys Val Gln Leu Trp Asp Cys		180		185		190
Val Ser Asn Arg Gln Val Arg Thr Leu Arg Gly Gly His Lys Ser Arg		195		200		205
Val Gly Ser Leu Ala Trp Asp His His Ile Leu Thr Thr Gly His Asp		210		215		220
Gly Lys Ile Val Met His Asp Val Arg Ile Arg Ser Ser Ile Val Arg		225		230		235
Thr Tyr Leu Gly His Thr Glu Glu Val Cys Gly Leu Lys Trp Ser Trp		245		250		255
Lys Ser Gly Asn Lys Gln Ala Ser Gly Gly Asn Asp Asn Val Val His		260		265		270
Ile Trp Asp Ala Ser Leu Ala Ser Ser Lys Gln Thr Ala Gln Trp Leu		275		280		285
His Arg Phe Arg Glu His Thr Ala Ala Val Ala Ala Leu Ala Trp Cys		290		295		300
Pro Phe Gln Ala Ser Leu Leu Ala Thr Gly Gly Gly Val Gly Asp Gln		305		310		315
Lys Ile Lys Phe Trp Asn Thr Asn Thr Gly Ala Cys Leu Asn Ser Val		325		330		335
Lys Thr Gly Ser Gln Val Cys Ser Leu Leu Trp Ser Gln Ser Glu Arg		340		345		350
Glu Leu Leu Ser Ser His Gly Phe Thr Gln Asn Gln Leu Thr Leu Trp						

355

360

365

Lys Tyr Pro Ser Met Ser Lys Met Ala Lys Leu Asn Gly His Thr Ser
 370 375 380

Arg Val Leu Phe Met Ala Gln Ser Pro Asn Gly Cys Thr Val Ala Ser
 385 390 395 400

Ala Ala Gly Asp Glu His Leu Arg Leu Trp Asn Val Phe Gly Lys Pro
 405 410 415

Pro Lys Thr Thr Lys Lys Ala Ala Ser Lys Lys Tyr Pro Glu Leu Phe
 420 425 430

Ser Ser Val Asn Ser Leu Arg
 435

<210> 12

<211> 463

<212> PRT

<213> Arabidopsis thaliana

<400> 12

Met Arg Asn Leu Ser Pro Ala Met Asn Thr Pro Val Val Ser Leu Lys
 1 5 10 15

Ser Arg Ile Asn Arg Leu Ile Asn Ala Asn Gln Gln Ser Pro Ser Pro
 20 25 30

Ser Ser Leu Ser Arg Ser Ile Tyr Ser Asp Arg Phe Ile Pro Ser Arg
 35 40 45

Ser Gly Ser Asn Phe Ala Leu Phe Asp Leu Ser Pro Ser Pro Ser Lys
 50 55 60

Asp Gln Lys Glu Asp Gly Ala Gly Ser Tyr Ala Thr Leu Leu Arg Ala

65

70

75

80

Ala Met Phe Gly Pro Glu Thr Pro Lys Lys Ala Asp Ile Thr Gly Phe
85 90 95

Ser Ser Ser Arg Asn Ile Phe Arg Phe Lys Thr Lys Thr His Arg Ser
100 105 110

Leu Asn Ser Phe Ser Pro Phe Gln Val Asp Asp Asp Ser Pro Gly Val
115 120 125

Ser His Ser Gln Pro Val Phe Ala Phe Arg Lys Val Pro Arg Ser Pro
130 135 140

Tyr Lys Val Leu Asp Ala Pro Ala Leu Gln Asp Asp Phe Tyr Leu Asn
145 150 155 160

Leu Val Asp Trp Ser Ala Gln Asn Val Leu Ala Val Gly Leu Gly Asn
165 170 175

Cys Val Tyr Leu Trp Asn Ala Cys Ser Ser Lys Val Thr Lys Leu Cys
180 185 190

Asp Leu Gly Ala Arg Asp Ser Val Cys Ser Val Gly Trp Ala Leu Arg
195 200 205

Gly Thr His Leu Ala Val Gly Thr Ser Thr Gly Lys Val Ile Trp Asp
210 215 220

Ala Ser Arg Cys Lys Arg Thr Arg Thr Met Glu Gly His Ala Leu Arg
225 230 235 240

Val Gly Ala Leu Ala Trp Gly Ser Ser Val Leu Ser Ser Gly Ser Arg
245 250 255

Asp Lys Ser Ile Leu Gln Arg Asp Ile Arg Cys Gln Glu Asp Lys Val
260 265 270

Ser Lys Leu Ala Gly His Lys Ser Glu Val Cys Gly Leu Lys Trp Ser

275

280

285

Tyr Asp Asn Arg Glu Leu Ala Ser Gly Gly Asn Asp Asn Ala Leu Phe
290 295 300

Val Trp Asn Gln His Ser Thr Gln Pro Val Leu Lys Tyr Ser Glu His
305 310 315 320

Thr Ala Ala Val Lys Ala Ile Ala Trp Ser Pro His Val His Gly Leu
325 330 335

Leu Ala Ser Gly Gly Gly Thr Ala Asp Arg Cys Ile Ala Phe Trp Asn
340 345 350

Thr Thr Thr Asn Thr Asn Leu Ser Ser Ile Asp Thr Cys Ser Gln Val
355 360 365

Cys Asn Leu Ala Trp Ser Lys Asn Val Asn Glu Leu Val Ser Thr His
370 375 380

Gly Tyr Ser Gln Asn Gln Ile Ile Val Trp Lys Tyr Pro Thr Met Ser
385 390 395 400

Lys Ile Ala Thr Leu Thr Gly His Thr Tyr Arg Val Leu Tyr Leu Ala
405 410 415

Tyr Ser Pro Asp Gly Gln Thr Ile Val Thr Gly Ala Gly Asp Glu Thr
420 425 430

Leu Arg Phe Trp Asn Val Phe Pro Ser Pro Lys Ser Gln Gln Asn Thr
435 440 445

Asp Ser Lys Ile Gly Ser Ser Phe Phe Gly Arg Thr Thr Ile Arg
450 455 460

<210> 13

<211> 465

<212> PRT

<213> Arabidopsis thaliana

<400> 13

Met Asn Gln Thr Ser Leu Met Leu Lys Thr Phe Ser Ser Ser Phe Arg
1 5 10 15

Gly Ile Ser Ser Leu Ser Ser Pro Ser Lys Ser Thr Cys Ser Asp Arg
20 25 30

Phe Ile Pro Cys Arg Ser Ser Ser Arg Leu Met Ala Phe Asp Leu Gln
35 40 45

Asp Lys Lys Pro Thr Thr Pro Val Lys Arg Gly Gly Asn Arg Ala Tyr
50 55 60

Ser Arg Leu Leu Lys Ser Glu Leu Phe Gly Ser Asp Phe Ala Ser Phe
65 70 75 80

Leu Leu Ser Pro Ala Gly Gly Gly Gly Ser Ala Ser Ser Pro Met Ser
85 90 95

Pro Cys Thr Asn Asn Leu Arg Phe Lys Thr Asp Arg Ser Asn Ser Ser
100 105 110

Pro Ser Pro Phe Ser Pro Ser Ile Leu Gly Asn Asp Asn Gly His Ser
115 120 125

Ser Asp Ser Ser Pro Pro Pro Phe Pro Pro Arg Lys Val Pro Lys Thr
130 135 140

Pro Met Lys Val Leu Asp Ala Pro Ser Leu Gln Asp Asp Phe Tyr Leu
145 150 155 160

Asn Val Val Asp Trp Ser Ser Gln Asn Val Leu Ala Val Gly Leu Gly
165 170 175

Thr Cys Val Tyr Leu Trp Thr Ala Ser Asn Ser Lys Val Thr Lys Leu
180 185 190

Cys Asp Leu Gly Pro Asn Asp Ser Val Cys Ser Val Gln Trp Thr Arg
 195 200 205
 Glu Gly Ser Tyr Lys Ser Ile Gly Thr Ser Met Gly Gln Val Gln Val
 210 215 220
 Trp Asp Gly Thr Gln Cys Lys Arg Val Arg Thr His Gly Gly His Gln
 225 230 235 240
 Thr Arg Thr Gly Val Leu Ala Trp Asn Ser Arg Ile Leu Ser Ser Gly
 245 250 255
 Ser Arg Asp Arg Asn Ile Leu Gln Asn Asp Ile Arg Val Gln Ser Asp
 260 265 270
 Phe Val Ser Lys Leu Val Gly His Lys Ser Glu Val Cys Gly Leu Lys
 275 280 285
 Trp Ser Met Asp Asp Arg Glu Leu Ala Ser Gly Gly Asn Asp Asn Gln
 290 295 300
 Leu Leu Val Trp Asn Asn His Ser Gln Gln Pro Ile Leu Lys Leu Thr
 305 310 315 320
 Glu His Thr Ala Ala Val Lys Ala Ile Thr Trp Ser Pro His Gln Ser
 325 330 335
 Ser Leu Leu Ala Ser Gly Gly Gly Thr Ala Asp Arg Cys Ile Arg Phe
 340 345 350
 Trp Asn Thr Thr Asn Gly Asn Gln Leu Asn Ser Ile Asp Thr Gly Ser
 355 360 365
 Gln Val Cys Asn Leu Ala Trp Ser Lys Asn Val Asn Glu Ile Val Ser
 370 375 380
 Thr His Gly Tyr Ser Gln Asn Gln Ile Met Leu Trp Lys Tyr Pro Ser
 385 390 395 400

Met Ser Lys Val Ala Thr Leu Thr Gly His Ser Met Arg Val Leu Tyr
 405 410 415

Leu Ala Thr Ser Pro Asp Gly Gln Thr Ile Val Thr Gly Ala Gly Asp
 420 425 430

Glu Thr Leu Arg Phe Trp Asn Val Phe Pro Ser Val Lys Met Gln Gln
 435 440 445

Thr Pro Val Lys Asp Thr Gly Leu Asn Ser Leu Gly Arg Thr Gln Ile
 450 455 460

Arg
 465

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